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Abstract of the Disclosure

In an ion trap mass spectrometer, between an ion supply source and an ion trap, there are disposed an entrance gate electrode, an ion storing section for holding ions by accumulating them near an exit side by means of an RF voltage with an axial electric field inclined from an entrance side to the exit side, and an exit gate electrode. When the ions are accumulated near the exit side, the exit gate electrode is opened to thereby introduce the ions in the pulse state into the ion trap. At this point, a voltage is not applied to a ring electrode of the ion trap, so that repulsion due to the voltage of the ring electrode is eliminated. Thereafter, when maximum amount of ions stay inside the ion trap, ring RF voltage is suddenly applied. Thus, the maximum amount of the ions can be introduced into the ion trap.